

WORLDWIDE EMERGING ENVIRONMENTAL ISSUES AFFECTING THE U.S. MILITARY
Contract No: DAAD19-02-D-0001/ Delivery Order 0456 with Battelle Columbus Operations for the U.S. Army
Environmental Policy Institute

JANUARY 2007 REPORT

Note to Readers: Pages 1-13 comprise the summary and analysis of this report. Expanded details for some items are in the Appendix beginning on page 14.

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Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE JAN 2007		2. REPORT TYPE		3. DATES COVERED 00-00-2007 to 00-00-2007	
4. TITLE AND SUBTITLE Worldwide Emerging Environmental Issues Affecting the U.S. Military. January 2007				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) The Millennium Project ,4421 Garrison Street, N.W. ,Washington,DC,20016-4055				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 26	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

Item 1. New UN Secretary-General Announced Climate Change a Top Priority

UN Secretary-General Ban Ki-Moon took office on January 1, 2007 and listed addressing global climate change as a top priority during all of his major meetings, including his first press conference at the UN, his meeting with President George Bush, and public talks in Washington and with the EU leaders in Brussels. Climate change also topped the agenda of the World Economic Forum Annual Meeting at Davos, where Tony Blair said that addressing climate change was the “supreme expression of interdependence.” President Bush for the first time included the issue in his State of the Union address, the new Democratic leadership in the US Congress has it among its top priorities, and corporations are forming relationships with environmental groups. Hence, it is clear that the international politics of climate change could have dramatic changes over the next several years.

Military Implications:

The military should take advantage of this changing political environment to launch a higher national and international profile for the Army Strategy for the Environment and go into greater detailed planning to carry it out. The public still remains quite unaware of how far along the Army has moved in policy and practice compared to many other public and private institutions.

Sources:

UN official proposes global summit on climate change to plan next steps

<http://www.un.org/apps/news/story.asp?NewsID=21244&Cr=climate&Cr1=change>

UN's Ban Urged to Lead Global Climate Change Plans

<http://www.planetark.com/dailynewsstory.cfm/newsid/39865/story.htm>

New U.N. chief on first overseas tour

<http://www.upi.com/InternationalIntelligence/view.php?StoryID=20070124-040725-7303r>

World Economic Forum Annual Meeting 2007. The Shifting Power Equation

<http://www.weforum.org/en/events/AnnualMeeting2007/index.htm>

Could Corporate America take the lead in Climate Change?

<http://www.euractiv.com/en/energy/corporate-america-take-lead-climate-change/article-161093>

Army Strategy for the Environment

<http://www.aepi.army.mil/pubs-strategic.html>

Item 2. OSCE Environmental Security Conference Focuses on Land and Water

On January 22-23, 2007 the Organization for Security and Co-operation in Europe (OSCE) held a conference with the theme: “Key challenges to ensure environmental security and sustainable development in the OSCE area: Land degradation, soil contamination and water management.” The speakers were a diverse mix of mostly European political, governmental, environmental, and security experts, who further developed OSCE’s role in environmental security for the region. Germany offered to take the leadership in environmental cleaning up of closed military facilities in the region. OSCE is composed of 56 countries. “The most significant issue presented was the critical rate of loss of arable lands in the arid regions of Eastern Europe. Experts from these countries requested urgent assistance from the OSCE to stem this impending crisis,” said Dr. King of the U.S. Army Command and General Staff College, who led the first panel.

Military Implications:

Plans to conduct U.S. military training and operate facilities in Eastern Europe could be affected by future policies growing from these discussions. BG (R). Christopher King, Ph.D., P.E., Dean of Academics, U.S. Army Command and General Staff College, led the first panel, speaking about: *Concepts of Strategic Environmental Security*. Military personnel with related responsibilities should e-mail Dr. King at <Wendell.c.king@leavenworth.army.mil> for his paper and assessment of the conference.

Source:

OSCE Economic and Environmental Forum. Part 1 / Vienna, 22 - 23 January 2007. "Key challenges to ensure environmental security and sustainable development"

http://194.8.63.155/documents/eea/2007/01/22718_en.pdf

Item 3. Asian Consortium on Non-traditional Security Issues

The *Consortium of Non-traditional Security Studies in Asia (NTS-Asia)* is made up of 14 research institutes and think tanks from Asia that will study issues including efforts to tackle pandemics, environmental degradation, and cooperation during disasters resulting from climate changes. Climate change, the avian flu, and other "invisible, diverse, and unpredictable" threats are becoming a top security concern in many Asian countries. The consortium will be hosted by Singapore and plans to hold annual conferences on non-traditional security issues with peer institutes from the U.S. and Europe.

Military Implications:

The military should consider attending the annual conference on non-traditional security issues. Relevant military personnel might also consider collaborating with the consortium in exploring how the capacity of the military can be best mobilized in tackling such "unconventional" threats. If the Army's Emerging Non-traditional Security Issues (ENSI) Program still exists, that would be an appropriate linking mechanism.

Sources:

Singapore to host consortium studying non-traditional security issues

<http://www.channelnewsasia.com/stories/singaporelocalnews/view/251242/1/.html>

Bird flu, climate change among Asia's threats

<http://www.todayonline.com/articles/164675.asp>

Item 4. Environment a Key Element in the First European 18-month Work Program

For the first time, the European Council adopted an 18-month work program for the following three European Presidencies to be held from January 2007 to June 2008 by Germany, Portugal, and Slovenia. Along with economic and security matters, it covers environment and sustainable development issues, a reassurance that the EU Strategy for Sustainable Development remains in the focus of policymaking. The Environment chapter includes climate change, biodiversity, environmental technologies, and international environmental governance. The *18-month Programme* confirms the EU's strong commitment to environmental matters.

Military Implications:

Relevant military personnel with environmentally-related responsibilities in Europe should review the Program for eventual implications for operational planning and training.

Source:

EU 18-months Work Programme

http://www.eu2007.de/en/The_Council_Presidency/Priorities_Programmes/index.html

Item 5. 2007—The International Year of the Ozone Layer

The year 2007 is designated The International Year of the Ozone Layer, marking the 20th anniversary of the signing of the Montreal Protocol. Since its entry into force, January 1, 1989, the Montreal Protocol has undergone five revisions, the last one in 1999. “Perhaps the single most successful international agreement to date” (as noted by Kofi Annan, former UN Secretary-General), the treaty is widely adopted and implemented. Nevertheless, due to the accumulative effect, the ozone hole was the largest recorded last September. The next meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer will be hosted by Canada in Montreal, September 17-21, 2007.

Military Implications:

The anniversary of the Protocol could trigger additional meetings and research to better understand ozone-depleting factors, which might further expand the list of ozone-depleting substances covered by the Montreal Protocol. The military should follow these events to know if new material substitutes will be required.

Sources:

Gallon Newsletter (By e-mail; see full text in the [Appendix](#))

Montreal Protocol <http://hq.unep.org/ozone/Montreal-Protocol/Montreal-Protocol2000.shtml>

UNEP Ozone Theme <http://unep.org/themes/ozone/>

The Ozone Hole <http://www.theozonehole.com/montreal.htm>

NASA and NOAA Announce Ozone Hole is a Double Record Breaker

http://www.nasa.gov/vision/earth/environment/ozone_resource_page.html

Item 6. Technological Breakthroughs with Environmental Security Implications**6.1 New Surface Decontamination Method**

Bradley D. Veatch of Westminster, CO and associates have filed a patent application for a novel means of removing contamination, including radioactive material, from surfaces. An abrasive foam pad soaked in a mix of latex gel and conductive iodine solution is rubbed over the contaminated area, loosening any surface material and applying a layer of latex, while a high current is passed through it. An electrolytic reaction transfers the contaminant from the surface into the latex gel, and also polymerizes the gel, producing a strong rubbery skin, which can be peeled off and safely discarded.

Military Implications:

The military should consider investigating this technique for its usefulness in accident and post-conflict cleanup.

Sources:

Electro-Decontamination Of Contaminated Surfaces (WO/2007/001263)

<http://www.wipo.int/pctdb/en/ia.jsp?IA=US2005/021455&LANGUAGE=EN>

Wrap radiation in rubber

<http://www.newscientisttech.com/article/dn10874?DCMP=NLC-nletter&nsref=dn10874> (see 3-rd article)

6.2 Virus Detection Technique—Fast, Convenient, and Sensitive

Aurel Ymeti and associated researchers at the Univ. of Twente, Enschede, the Netherlands, and elsewhere, have developed an improved new technique for virus detection and identification. As is the case with a number of other methods, it depends on the adhesion of the virus to an antibody-coated surface, but here the adhesion is detected optically, greatly improving the device's characteristics. A monochromatic laser beam is sent down a path which branches into two parallel channels and then rejoins. One of the channels is coated with the antibody; the beam in that channel undergoes a phase shift if the sample has attached to the antibody. When the beams from the channels are recombined, the phase shift produces a pattern of interference fringes if the virus was present. This detector is able to detect the herpes virus at just 850 particles per milliliter under physiological conditions (e.g. in human serum).

Military Implications:

The military should follow up on this research to explore its applicability to field virus detection systems.

Source:

Virus detection encounters some useful interference

<http://www.nature.com/materials/nanozone/news/070111/portal/m070111-3.html> (free registration required; full text of the article in the [Appendix](#))

6.3 New Technique for DNA Isolation

TNO, in Delft, Netherlands, has developed a new tool, SamPrep, for the rapid automatic pre-treatment of biological material to separate out pure DNA for further analysis. The new automated system can produce results from a sample in 20 minutes instead of the hours required for manual manipulation.

Military Implications:

The military should investigate this technique for its applicability as a front end for fieldable DNA-based environment scanning systems, some of which have been described in previous environmental security reports.

Source:

Step forward in micro/nanotechnology

http://www.tno.nl/tno/actueel/tno_persberichten/2007/tno_ontwikkelt_generieke_/index.xml
(English version available in the [Appendix](#))

6.4 World Record solar cell efficiency achieved

Spectrolab, a subsidiary of Boeing, announced the development of a new solar cell that can convert 40.7% of the sunlight into electricity. The conversion efficiency of today's conventional solar cells is between 12% and 18%. The Department of Energy claims that 'this breakthrough may lead to

systems with an installation cost of only \$3 per watt, producing electricity at a cost of 8-10 cents per kilowatt/hour, making solar electricity a more cost-competitive and integral part of our nation's energy mix.'

Military Implications:

Technological breakthrough like this could help the military significantly reduce its greenhouse gases emissions in the near future without increasing operating costs. The military should monitor the cost-effectiveness of such technologies and consider potential use and adaptation for military devices/equipment as the technologies become more competitive.

Sources:

New World Record Achieved in Solar Cell Technology

<http://www.energy.gov/news/4503.htm>

Solar cell breakthrough claimed

<http://www.planet2025news.net/ntext.rxml?id=3895&photo=>

Solar America Initiative website: http://www1.eere.energy.gov/solar/solar_america/

Item 7. Updates on Previously Identified Issues**7.1 Proposal for Recognizing Water as a Basic Human Right**

The declaration of the first Meeting of the Parties to the Protocol on Water and Health to the Convention on the Protection and Use of Transboundary Watercourses and International Lakes includes a paragraph on water as a basic human right. The meeting adopted several decisions, mostly related to the implementation and compliance procedures of the Protocol, transparency, and involvement of local authorities into the Protocol's implementation at early stage. The European ECO-Forum proposed the development of guidelines for governments (national and local authorities) to help in the implementation of the Protocol and urged that they be adopted at the Second Meeting of Parties that would be hosted by Romania in 2010. The first meeting was held January 17-19, 2007 at the Palais des Nations, in Geneva, Switzerland. The Protocol entered into force on August 4, 2005 and as of January 2007, has been ratified by 21 countries. [See also *World Water Forum* in March 2006, *Unless Water Management Improves, Conflicts over Water Are Inevitable* in August 2006, *Water Disinfection Conference to be Held in February 2007* in May 2006, and other previous environmental security reports on the water issue.]

Military Implications:

[Similar to previous on the same issue] Military personnel who assess potential conflicts related to water and other water management issues should review the outcomes of the meeting for implications for their plans and collaboration opportunities for reducing water problems internationally. The militaries of leading countries should develop a panel on the role of the militaries around the world in solving water problems. [Note: U.S. is not Party to the Protocol.]

Sources:

First meeting of the Parties (Geneva, 17-19 January 2007)

http://www.unece.org/env/water/meetings/documents_MoPPWH.htm

Protocol on Water and Health

http://www.unece.org/env/water/text/text_protocol.htm

European ECO-Forum Newsletter No. 16, January 2007 (Relevant text in the [Appendix](#))

7.2 Stronger Policies needed Worldwide for Curbing Greenhouse Gas Emissions

7.2.1 UK Standard for Carbon Offsetting

The UK became the first government in the world to introduce a standard for carbon offsetting in the private sector. This voluntary code, expected to be in place by fall 2007, will provide businesses, and people wanting to be “carbon neutral” with information on the efficiency of the offsetting schemes they intend to use. The British standard will work in the private sector (organizations and individuals) in the same way that the UN carbon credits scheme works for countries that try to meet emission targets under the Kyoto Protocol (paying others for acts that help neutralize one's emissions.) Note: the UK is the only EU country that has fulfilled the European Commission pollution-allowances criteria for cutting greenhouse gasses. While most other countries' schemes are considered weak, Belgium and the Netherlands were asked to toughen their national pollution-allowances scheme (mainly for heavy industry), and Denmark and Hungary are facing legal action for having missed the June 30 deadline for submitting their national allocation plans.

7.2.2 Advancing Post-Kyoto Negotiations

The European Commission proposed a new Energy Policy for Europe, an integrated energy and climate change package to cut emissions and combat climate change while boosting the EU's energy security and competitiveness. The package of proposals commits to cut EU greenhouse gas emissions by at least 20% by 2020, mainly through energy measures. The EC also reinforces its commitment of leadership for negotiating an international agreement for a post-2012 framework that could lead to an average cut in emissions from developed countries of 30% below 1990 levels by 2020. [See also *New EU Environmental Policies; European Action Plan on Energy Efficiency* in October 2006, and *New European Energy Policy Developments* in March 2006 environmental security reports.]

At an “informal” two-day conference in Tokyo, senior officials from 20 countries (including the U.S., China and India) accounting for about 70% of total global greenhouse gas emissions, started work on a post-Kyoto agreement.

At the World Economic Forum in Davos, German Chancellor Angela Merkel, in her keynote address, called on all countries to join a post-Kyoto binding accord and take responsibility for cutting greenhouse gases.

7.2.3 East Asian Energy Security Agreement

The Cebu, Philippines Declaration on East Asian Energy Security, signed by leaders of the 10-member Association of Southeast Asian Nations (ASEAN) and the leaders of Australia, China, India, Japan, South Korea and New Zealand, commits the signatory countries to reduce greenhouse gas emissions and their dependence on fossil fuels by promoting cleaner energy technologies. However, the Declaration does not set any timeframe or specific targets.

7.2.4 U.S. Climate Action Partnership

Ten major U.S. businesses and four national environmental organizations formed the United States Climate Action Partnership (US-CAP) alliance, calling on the federal government to pass strong national legislation to cut pollution responsible for global warming. The organizations involved are Environmental Defense, the World Resources Institute, Pew Center on Global Climate Change, the Natural Resources Defense Council, and Fortune 500 corporations: Alcoa, BP America, Caterpillar, Duke Energy, DuPont, Florida Power and Light, General Electric, Lehman Brothers, Pacific Gas &

Electric, and PNM Resources. In the 2007 State of the Union address, President Bush called for a dramatic 20% reduction in the U.S.'s gasoline consumption within 10 years.

Military Implications:

The military should consider following these initiatives that might result in new environmental regulations and new standards policies, and consequently emerging strategies, to ensure that its activities in the respective regions comply with any new requirements. Also, some of these new initiatives, such as the UK standard for carbon offsetting, if proven effective, might get emulated to larger regions.

Sources: [see a more complete list of sources in the [Appendix](#)]

UK to tackle bogus carbon schemes

<http://news.bbc.co.uk/2/low/business/6273061.stm>

Commission proposes an integrated energy and climate change package to cut emissions for the 21st Century

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/07/29&format=HTML&aged=0&language=EN&guiLanguage=en>

Climate Change: Why a Global Response needs European Leadership. Stavros Dimas SPEECH/07/8

<http://europa.eu/rapid/pressReleasesAction.do?reference=SPEECH/07/8&format=PDF&aged=0&language=EN&guiLanguage=en>

Tokyo Climate Change Meeting Eyes Post-Kyoto Rules

<http://www.planetark.com/dailynewsstory.cfm/newsid/40011/story.htm>

Cebu Declaration on East Asian Energy Security. Cebu, Philippines, 15 January 2007

<http://www.aseansec.org/19319.htm>

Ten Major Companies Call for Climate Action

<http://www.environmentaldefense.org/article.cfm?ContentID=5828>

7.3 EU Seeking Global Mercury Ban

Health and environmental NGOs launched on January 10, 2007, the campaign “Stay Healthy, Stop Mercury” calling on the EU to promote global control on mercury pollution. The EU is expected to raise the global mercury ban issue at next month’s UN Global Ministerial Environment Forum to be held in Nairobi, Kenya, February 5-9. [See also *Europe Proposes Ban on Mercury Exports* in November 2006, *Mercury Instruments May Be Banned in EU* in February 2006, and other previous environmental security reports on the mercury issue.]

Military Implications:

Relevant military personnel should assess which areas would be affected by the mercury export ban (from Europe by 2011) and then by an eventual global regulation on the use of mercury. Such developments could complicate repatriation or movement of materiel.

Sources:

EU seeks global mercury ban

<http://www.euractiv.com/en/environment/eu-seeks-global-mercury-ban/article-160845>

Halting the Child Brain Drain. Why we need to tackle global mercury contamination

http://www.env-health.org/IMG/pdf/mercury_full_report.pdf

Health experts call on EU to impose total ban on use of mercury

<http://www.iht.com/articles/ap/2007/01/10/europe/EU-GEN-EU-Mercury.php>

7.4 Climate Change

7.4.1 Further Evidence of Climate Change

The US National Oceanic and Atmospheric Administration revealed that the CO₂ growth rate for 2006 was 2.05 ppm and the yearly average rise since 2001 was 2.1 ppm, meaning a faster accumulation in the atmosphere than scientists expected, and raising fears over the time available to tackle climate change. Preliminary data compiled by the World Meteorological Organization show that globally, the year 2006 is estimated to be the sixth warmest year since recordkeeping began in 1880. Also, 2006 registered the largest ever ozone hole area (September 21-30, 2006) and the second lowest average sea ice extent for the month of September. The organization notes that the September sea ice decline rate is about 9% per decade. Heat waves and droughts hit many parts of the world. The final figures will be released in March 2007. Newly released data by the World Glacier Monitoring Service reveal that in the period 2000–2005, mountain glaciers around the world melted at 1.6 times the average rate of the 1990s and 3 times that of the 1980s. A new study presents a doom-laden future for Europe, arguing that Europe is warming faster than the global average, and climate change will transform the face of the continent, affecting all sectors, but mainly its economy—particularly agriculture and tourism—and health.

7.4.2 Mapping Climate Change

A new index developed by scientists of the Swiss Federal Institute of Technology in Zurich, allows mapping the different ways that climate change will affect different parts of the world. This is the first map to show how global warming combined with natural variations in the climate would affect our planet, highlighting the frequency of extreme climate events—such as heat waves and floods—by 2100 compared with the late 20th century. It is intended to “help policy-makers gain a quick overview of the scientific facts without getting lost in the detail,” says Michèle Bättig, member of the team. [See one of the maps in the [Appendix](#)]

7.4.3 Global Security linked to Climate Change

“Violence within and between communities and between nation states, we must accept, could possibly increase, because the precedents are all around”, warned Sir Crispin Tickell, Britain's former ambassador to the UN at the recent London conference, *Climate Change: the Global Security Impact*, hosted by the Royal United Services Institute. Security and climate experts assessed the impact of global warming on world security, noting again that in many cases, climate change consequences happen in already conflict-torn regions. Poverty and despair will increase as millions of people around the world are threatened by desertification, poor fresh water conditions, and rising sea levels. Unless global efforts to accommodate these people increase, the risk of conflict and terrorism grows. At the Economic Forum of Davos, there was a workshop on climate change and security, where panelists discussed the undeniable consequences of climate change on global security.

Military Implications:

[Same as previous on similar issues] Extreme weather conditions, threats to food supply, and loss of livelihood (mostly in already problem-ridden regions) might increase unrest and threaten global stability. The U.S. Army Corps of Engineers—having the logistics and know-how—should consider, or expand, worldwide collaboration with counterparts and international organizations (e.g. the UNU Institute for Environment and Human Security in Bonn) to determine priorities on which communities need what kind of help from a network of state and international agencies. Also, the issue of environmental refugees should be tackled swiftly to avoid conflicts that this rising segment of world population might cause.

Sources:

Surge in carbon levels raises fears of runaway warming

<http://environment.guardian.co.uk/climatechange/story/0,,1994071,00.html?gusrc=rss&feed=1>

2006 Was the Sixth Warmest Year Ever

<http://www.ens-newswire.com/ens/jan2007/2007-01-03-02.asp>

Worldwide Glacier Melting Underlined in Newly Released Data

<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=498&ArticleID=5502&l=en>

How global warming will change the face of Europe

<http://www.thisislondon.co.uk/news/article-23381157-details/How%20global%20warming%20will%20change%20the%20face%20of%20Europe/article.do>

2100: A world of wild weather. NewScientist.com news service, 18 January 2007

<http://environment.newscientist.com/article/mg19325874.000?DCMP=NLC-nletter&nsref=mg19325874.000>

EU warns of global climate chaos

<http://www.guardian.co.uk/international/story/0,,1987423,00.html>

Climate change seen fanning conflict and terrorism

<http://www.sciam.com/article.cfm?chanID=sa003&articleID=F416D0FBCE436DDE50730DF3A12BBA3B>

Nigerian houses swallowed by sand

<http://news.bbc.co.uk/2/hi/africa/6288445.stm>

Jean Charest panelist at the workshop on the implications of climate change on security

<http://www.premier.gouv.qc.ca/salle-de-presse/communiqués/2007/janvier/2007-01-24-en.shtml> (in French)

DAVOS Trade talks, climate change, Middle East set to dominate WEF UPDATE

<http://www.forbes.com/markets/feeds/afx/2007/01/24/afx3356349.html>

7.5 Environmental Legacy of Hezbollah-Israeli War

Lebanon—Post-Conflict Environmental Assessment, UNEP's Post Conflict Branch report, is a comprehensive assessment of the legacy of last summer's Hezbollah-Israeli war in Lebanon and its impact on the environment and human health. The report details serious environmental challenges confronting the Lebanese authorities and threatening the population's health, and calls for urgent remediation actions. The highest risks are posed by leaked toxic and health hazardous substances, disposal of significant quantities of war-related debris, unexploded cluster bombs, and damaged water supply and sewage networks. [See also *Addressing Post-Conflict Environmental Security Issues* in August 2006 and *Hezbollah-Israeli War Threatens an Already Precarious Environment* in July 2006 environmental security reports.]

Note: At a recent donor conference in Paris, the international community pledged some US\$7.6 billion in aid, loans and other help for Lebanon's reconstruction.

Military Implications:

[Similar to previous on the same issue] The international community is still paying for environmental cleanups for past conflicts. It is likely that there will be increasing pressure for increased precision with decreased environmental impact in future R&D products, updating laws, assigning liability, and defining redress issues concerning environmental damages in war. [See also related items in *Conflict and Post-Conflict Environmental Security Issues* section of *Chapter 9.1 Emerging Environmental Security Issues* on the CD accompanying the *2006 State of the Future* report by the ACUNU Millennium Project]

Sources:

UNEP Report Highlights Environmental Legacy of the Lebanon Conflict

<http://unep.org/Documents.Multilingual/Default.asp?DocumentID=498&ArticleID=5499&l=en>

Lebanon—Post-Conflict Environmental Assessment

http://unep.org/pdf/Lebanon_PCOB_Report.pdf

Global conference pledges billions of dollars for Lebanon

<http://www.iht.com/articles/ap/2007/01/25/europe/EU-GEN-Europe-Funding-Lebanon.php>

Paris, France, 25 January 2007 - Secretary-General's remarks at International Donor Conference on Reconstruction in Lebanon

<http://www.un.org/apps/sg/sgstats.asp?nid=2420>

7.6 Nanotechnology Safety Assessment

Activities and studies for assessing nanotechnology safety are escalating. Some noteworthy ones are: (more detailed description of each is available in the [Appendix](#))

- the American Public Health Association has included addressing the potential safety risks of nanotechnology as one of its public health policies
- the National Nanotechnology Initiative (NNI) held a Public Meeting on Research Needs related to the Environmental, Health, and Safety Aspects of Engineered Nanoscale Materials
- the International Council on Nanotechnology has held one invitation-only workshop to develop an International Nanomaterial Environmental Health and Safety (NanoEHS) Research Needs Assessment, and plans a second workshop, to be held in Europe in Spring 2007
- “Nanotoxicology: Potential Risks and Safety Assessment”, a symposium held at Sweden's Nobel Forum, presented a wide spectrum of results related to understanding of properties and effects of nano-sized particles that have implications for occupational health
- a team from the Chinese Academy of Science's National Center for Nanoscience and Technology (NCNST) has started research into the bio-safety of artificial nano-materials
- Andrew Maynard, chief science advisor for the Project on Emerging Nanotechnologies at the Woodrow Wilson International Center, warned that safety experts are ill-equipped to handle nanotech in the workplace and proposed a middle-of-the-road approach to nanomaterial control, based on an "impact index" derived from the material's physical characteristics, and an "exposure index" related to its quantity and "dustiness"
- an International Symposium on Nanotechnology in Environmental Protection and Pollution, organized by the Asia Pacific Nanotechnology Forum, is planned for December 10-12, 2007.

Military Implications:

Relevant military personnel should review information generated by these assessments on nanotech environmental health and safety to improve military and contractor practices, as well as to assist and cooperate with the organizations working on those issues for enriching their studies.

Sources:

Safety Risks of Nanotechnology. American Public Health Association (full text of the announcement in the [Appendix](#))

Public Meeting on Research Needs and Priorities Related to the Environmental, Health, and Safety Aspects of Engineered Nanoscale Materials https://nnco.nano.gov/public_ehs/

ICON Research Needs Assessment Workshop

http://icon.rice.edu/centersandinst/icon/events.cfm?doc_id=10003

Mini-symposium on Nanotoxicology: Potential Risks and Safety Assessment

http://www.imm.ki.se/sft/pdfLW/SFT,KI,Nanotox_program_final,Nov27,2006.pdf

NCNST: http://www.nanoctr.cn/e_index.jsp

China kicks off study on bio-safety of nanomaterials

<http://www.nanowerk.com/news/newsid=1234.php>

Safety experts ill-equipped to handle nanotechnology in workplace

<http://www.physorg.com/news86529890.htm>

Nanotechnology and safety

<http://www.cleanroom-technology.co.uk/story.asp?sectionCode=44&storyCode=44919>

International Symposium on Nanotechnology in Environmental Protection and Pollution ISNEPP 2007

<http://www.isnepp.org/ISNEPP07/front1.htm>

Item 8. Reports Suggested for Review

8.1 ETC Report Warns of the Threat of Synthetic Biology and Calls for Global Regulations

An ETC Group report, *Extreme Genetic Engineering; An Introduction to Synthetic Biology*, covers five major areas of research in synthetic biology: making minimal microbes; assembly line DNA; building artificial cells from the bottom up; and pathway engineering and expanding earth's genetic system. The report looks at implications for trade, a synthetic energy agenda, intellectual property, the politics of biodiversity, and it warns, "today's synbio industry has made the work of bioweaponers a whole lot easier." It looks at 'synthetic governance' and gives some recommendations including the need for establishing an international body to monitor and assess societal impacts of emerging technologies—including synthetic biology—to facilitate coordinated global action, and the fact that "building blocks of life" shouldn't be privatized. The ETC Group presented the report and its recommendations at the World Social Forum held in Nairobi, Kenya, January 20-25. [See also *Futuristic Nanotech and Synthetic Bioweapons Regulation* in November 2006 environmental security report.]

Note: In September 2006, the European Commission 6th Framework Programme, NEST—New and Emerging Science and Technology published the report *Synbiology: An Analysis of Synthetic Biology Research in Europe and North America*, which is a synthesis of "1100 papers connected to the Synthetic Biology field in peer-reviewed journals published since 1990."

Military Implications:

Relevant military personnel covering synthetic biology should consider reviewing the report for insights on social and safety implications. Also, since ETC Group reports are widely read and the group is taking its findings to international forums, it is likely that—along with other such recommendations from different sources—some international organization and regulations for synthetic biology might emerge. The military should consider collaborating in the establishment of international safety standards, and anticipate potential regulations in the planning of future R&D in these areas.

Sources:

Extreme Genetic Engineering: An Introduction to Synthetic Biology

<http://www.etcgroup.org/upload/publication/602/01/synbioreportweb.pdf>

Extreme Genetic Engineering: ETC Group Releases Report on Synthetic Biology

<http://www.etcgroup.org/en/materials/publications.html?id=602>

SYNBIOLOGY An Analysis of Synthetic Biology Research in Europe and North America Final Report on Analysis of Synthetic Biology Sector

<http://www2.spi.pt/synbiology/documents/news/D8%20-%20Synthetic%20Biology%20Research%20Assessment.pdf>

8.2 Global Risk 2007, the World Economic Forum

Global Risks 2007; A Global Risk Network Report by the World Economic Forum (WEF) explores three risk scenarios: *Pandemic and Its Discontents*; *Out of the Global Warming Frying Pan (and Into the Fiscal Fire)*, and *Oil Shock and Its Consequences*. It also addresses policy issues related to mitigation and risk prioritization, the risk of water shortages, tropical storms and inland flooding, international terrorism and civil war. The report warns that climate change could cause up to \$250 billion loss over the next 10 years, and a sharp increase in oil prices could cause up to \$1 trillion of economic losses and trigger a global recession.

Military Implications:

The military should review the report for insights on potential security implications of these non-traditional risks mainly in already fragile regions.

Sources:

Global Risks 2007; A Global Risk Network Report

http://www.weforum.org/pdf/CSI/Global_Risks_2007.pdf

Global Risk Network: Mapping solutions to the greatest risks

<http://www.weforum.org/en/initiatives/globalrisk/index.htm>

8.3 State of the World 2007: Our Urban Future

Worldwatch Institute's *State of the World 2007: Our Urban Future* warns of possible perils from urbanization, if policies, technologies, and behaviors are not changed. The report assesses social and economic impacts of rapid urbanization, and suggests policies. (50% of the world is expected to be urban within a year.) The chapter *Reducing Natural Disaster Risk in Cities* notes that of the 33 cities projected to have at least 8 million residents by 2015, at least 21 are coastal cities that will be affected by possible sea-level rise due to climate change.

Military Implications:

The report is a source of information on the implications of urbanization, trends, and possible future developments. It should prove helpful in understanding future situations related to human security; and thus aid planning improvement, resource prioritization and preparedness action.

Source:

State of the World 2007: Our Urban Future

<http://www.worldwatch.org/node/4839>

8.4 Fourth Assessment Report Climate Change 2007

The first part of the four-volume *Climate Change 2007*, the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) will be released on February 2, 2007. News released in advance shows that climate change could be far worse than previously expected. A report on this first part of the IPCC Assessment will appear in next month's environmental security report. The other three parts of the Assessment focus on: impacts, adaptation and vulnerability to

climate change—to be released in April; mitigation—to be released in May; and the Synthesis Report—to be published in November 2007.

Military Implications:

Relevant military personnel should get the complete reports (and/or their drafts) for a comprehensive overview of the “state of the planet” and to review the policy considerations, since they might set the ground for further international negotiations and priority setting.

Sources:

Intergovernmental Panel on Climate Change (IPCC) <http://www.ipcc.ch/>
Assessment Reports <http://www.ipcc.ch/activity/ar.htm>

APPENDIX

Reference Details

This Appendix contains expanded background information on some items.

Item 5. 2007—The International Year of the Ozone Layer

Montreal Protocol

Source: Gallon Environment Letter v12 n1 Honoured Reader Edition. Mon, 22 Jan 2007

While not yet an entirely sure thing, the international agreements to deal with the loss of ozone in the atmosphere which threatened life through excessive UV radiation appear to have made considerable progress in much less than fifty years. This year 2007 - The International Year of the Ozone Layer - marks the 20th anniversary of the signing of the Montreal Protocol. Canada will host the 19th Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer in Montreal September 17-21 for the 20th anniversary.

As required by the agreement, a periodic assessment is done to measure progress and the state of scientific understanding. The 2006 State-of-Understanding Report was the result of work of 309 scientists from 34 countries including Canada. 205 scientists prepared the report and 183 participated in the peer review. Theodore G. Shepherd of the University of Toronto was one of five members on the Scientific Steering Committee. The result is "their current understanding of the stratospheric ozone layer and its relation to humankind." Previous reports indicated that the Montreal Protocol was working as the action of nations led to stabilizing or decreasing tropospheric abundance of more ozone-depleting substances as well as of stratospheric chlorine. This report continues to see progress.

The science has strengthened the understanding that man-made ozone depleting substances have been the principle cause of ozone depletion in the earth's atmosphere over the past few decades. The parts of the atmosphere are affected differently by ODSs. The troposphere, the layer extending from the earth's surface to 8 to 14 kilometres, is the region where most weather happens. The stratosphere extends from the troposphere to about 50 kilometres. A growing amount of satellite and other data is also providing insight into how the mesosphere, the layer above the stratosphere, extending to 85 kilometres, interacts with the lower layer in ozone depletion and recovery.

Fewer Ozone-Depleting Gases in the Atmosphere

By 2005, the total abundance of anthropogenic (human caused) ozone-depleting gases in the troposphere had decreased by 8-9% from the peak in 1992-94, consistent with estimated changes in emissions, known lifetimes and transport of the ODSs.

The substitutes used for CFCs, HCFCs (HCFC-22, -141b, and -142b) which are also ODSs but less so, increased less than projected, implying lower emissions. Bromine from both halons and methyl

bromide decreased by 3-5% since 1998 with methyl bromide abundance decreasing by 14% between 1997-2004. This decrease was more than expected and implies that reducing methyl bromide emissions reduces atmospheric abundance faster than has been thought.

The stratospheric abundance of ODSs has also decreased since its peak in the late 1990s. However, stratospheric bromine has increased (this mimics what happened to bromine in the troposphere where it increased before decreasing). Bromine is a major contributor to stratospheric ozone depletion. Source gases described as very short-lived containing bromine and chlorine make a significant contribution to total stratospheric bromine. Previous assessments expected the stratospheric ozone depletion to reverse within a decade. Bromine is now estimated to be 60 times stronger (rather than 45 times as previously thought) as chlorine in causing global ozone depletion, increasing the Ozone Depletion Potential of bromine containing compounds.

Ozone Recovery in Progress

The next step was to ask whether this control of ozone-depleting substances ODSs was leading to responses of stratospheric ozone and UV radiation which are affected not only by ODSs but also by aerosols (fine particles in the air), climate change, volcanic eruptions, solar variations and natural dynamical variability. ODS and many of their substitutes are also greenhouse gases. These factors mean that even a return to pre-1980 values of ODS may not return the ozone and UV radiation to their pre-1980 levels.

Large Antarctic ozone holes continue to occur but in 2002 and 2004 were smaller. This seems to be due to dynamical activity (e.g. unusual major stratospheric sudden warming) rather than due to decreases in ODSs. The Arctic ozone depletion is very variable due to meteorological conditions related to severe ozone depletion and increased greenhouse gas concentrations. In 2004-5, the exceptionally cold winter led to the largest ozone loss ever. Science is as yet unable to predict long-term trends or to detect the early stages of recovery. While UV radiation levels have decreased since the late 1990s as ozone levels increase, UV radiation is still increasing at some Northern Hemisphere monitoring stations.

In non-polar regions (60 deg S to 60 deg N) the best estimate appears to be that stratospheric ozone will return to its pre 1980 level by about 2050 or so. The Antarctic hole is expected to continue to 2060-2075 with not much improvement in the next few decades. That is about 10-25 years longer than estimated in the 2002 Assessment. Large Arctic ozone losses are expected in cold winters for the next 15 years. Arctic ozone levels are expected to return to pre-1980 levels before 2050 (with the caution of the limits of prediction).

As ozone depletion lessens, other factors such as aerosols and air pollution will play a greater role in UV radiation levels. Human activities other than ODSs also affect stratospheric ozone levels: e.g. methane from wetter and warmer soils increases ozone production in the lower stratosphere while nitrous oxide emissions from artificial fertilizer use reduces ozone in the middle and high stratosphere.

Failure to comply with the Montreal Protocol would delay or even prevent the recovery of the ozone layer.

It is interesting to note that many of the same noises about the science being unproven and about global economic catastrophe were made by certain companies in the Montreal Protocol time frame as are now being made about the Kyoto Protocol. Indeed, some of the very same players and mouthpieces were involved then and now. It is good to note that the modern day dinosaurs can be wrong. Although some were affected more than others, most in the industry didn't suffer economic meltdown because of the Montreal Protocol.

Gerard Megie: A Montreal Protocol Legacy

The latest scientific assessment of global progress on ozone depletion is dedicated to the memory of Prof. Gerard Megie of the Centre National de la Recherche Scientifique of Paris, France who died in 2004. While discussing Megie's contribution, this dedication also highlights a number of important issues related to his contributions which could be used as models for global environmental problems such as:

Making connections between global systems. Megie guided the Scientific Assessment Panel on the Montreal Protocol to realize the connections between the ozone layer and the climate system. Need to communicate scientific understanding at many levels. Megie promoted the importance of communication at the level of international decision-making as well as to the general public and schools. He provided a set of "Frequently asked" questions and answers about the ozone layer. An updated Q&A is to be included in the 2006 report at a later date.

Forging interactions between the scientific community and society. Science alone is not enough but scientific leadership can help to shape global action.

Source: Gallon Environment Letter v12 n1 Honoured Reader Edition. Mon, 22 Jan 2007

Item 6. Technological Breakthroughs with Environmental Security Implications

6.2 Virus Detection Technique—Fast, Convenient, and Sensitive

Virus detection encounters some useful interference

materials@nature.com 11 January 2007

by Philip Ball

<http://www.nature.com/materials/nanozone/news/070111/portal/m070111-3.html> (free registration required)

There are many ways of detecting viruses, even at very low concentrations — but none yet combines convenience, sensitivity and speed. A new prototype shows how it might be done.

The emergence of several new viral infectious diseases in recent years, such as SARS and H5N1 (avian flu), shows how important a rapid response to an outbreak can be. That means being able to identify the presence of the virus quickly and reliably in the clinic or perhaps in remote locations in the field, often in developing countries. There is currently no general-purpose 'virus-testing' kit that meets these requirements. But researchers in the Netherlands believe that they have now developed a prototype of such an instrument¹.

This virus detector is able to spot the herpes virus HSV-1 at concentrations of just 850 particles per millilitre under physiological conditions — in human serum, for example. The device is compact, fast and easy to use, and the researchers believe that it might be possible to extend its sensitivity so that it can detect single virus particles.

Conventional methods of searching for viruses are laborious and expensive. For example, the polymerase chain reaction can be used to amplify viral DNA from low levels so that it can be readily detected — but that requires a lot of sample preparation, making the method not only slow but also expensive and contingent on considerable laboratory expertise.

A promising recent alternative is to measure and identify virus particles by their adhesion forces to a surface coated with antibodies to the virus in question². This technique, called rupture event scanning, works under clinical conditions (for example, with viruses in serum), but it requires a rather complex initial preparation of antibody-coated surfaces, which is time-consuming. Viruses have also been detected that have extremely high sensitivity, down to just a single particle, through the effect that they have on the oscillation of nanomechanical resonators primed with antibodies to make them sticky to viruses^{3,4}. Those approaches remain a long way from being clinically applicable, however.

Viruses have also been sensed through the effect that they have on the conductivity of antibody-coated nanowires when they bind to the surface⁵. Aurel Ymeti of the University of Twente in Enschede and his co-workers have now created a kind of optical analogue of these nanowire sensors, in which binding of virus particles to antibody-labelled waveguides affects the passage of light down the channel.

Specifically, the binding causes a change in the phase of the light signal. This means that if monochromatic laser light is sent down two waveguides — a reference and a sensing channel — by means of a Y junction, and then recombined at the other end through a lens, the phase shift caused by analyte-binding sets up interference between the two beams, creating a pattern of light and dark fringes that can be recorded by a CCD camera. The sensor is thus basically a Young interferometer.

The Dutch researchers have previously reported the use of this device to detect proteins⁶. Their waveguide structure is fabricated on a silicon chip, with the input channel connected to a 650-nm (red light) laser. The device has four channels, interconnected through two tiers of Y junctions, so that in principle it can detect three different analytes at once. Just one of the channels has a monoclonal antibody for HSV-1 adsorbed to the surface. The researchers attached antibodies for other biomolecules (human serum albumin) to another of the channels, to verify that any change in the interference pattern was caused by specific recognition between the virus particles and their antibodies.

They found that a phase change was detectable in the analyte channel even at very low levels of virus in human serum, and that the sensor response was proportional to virus concentration across a clinically relevant range of four orders of magnitude in concentration. The weakest signal detected corresponded to the binding of about 700 particles to the analyte channel.

It takes some time (about an hour) for the particles to bind — but Ymeti and colleagues say that a good estimate of the virus concentration can be made from the sensor response within just the first few minutes of exposure to the solution. So the device is potentially fast, as well as being robust, small and requiring only very small volumes of analyte solution. All this, they say, recommends it for clinical and field use, and they are now working on a miniaturized portable prototype.

References

1. Ymeti A. et al. Fast, ultrasensitive virus detection using a Young interferometer sensor. *Nano Lett.* doi:10.1021/nl062595n (2006)

Article

2. Cooper M. A. et al. Direct and sensitive detection of a human virus by rupture event scanning. *Nature Biotech.* 19, 833–837 (2001)

Article

3. Gupta A., Akin D. & Bashir R. Single virus particle mass detection using microresonators with nanoscale thickness. *Appl. Phys. Lett.* 84, 1976–1978 (2004)

Article

4. Ilic B., Yang Y. & Craighead H. G. Virus detection using nanoelectromechanical devices. *Appl. Phys. Lett.* 85, 2604–2606 (2004)

Article

5. Patolsky F. et al. Electrical detection of single viruses. *Proc. Natl Acad. Sci. USA* 101, 14017–14022 (2004)

Article

6. Ymeti A. et al. Realization of a multichannel integrated Young interferometer chemical sensor. *Appl. Opt.* 42, 5649–5660 (2003)

6.3 New Technique for DNA Isolation

TNO develops generic technology for rapid inexpensive isolation of DNA from analysis samples

Step forward in micro/nanotechnology

Press release 2007-2

http://www.tno.nl/tno/actueel/tno_persberichten/2007/tno_ontwikkelt_generieke_/index.xml

TNO has developed a new tool based on micro/nanotechnology, called SamPrep, that enables the straightforward isolation of DNA from biological material. In molecular diagnostic research the first stage of to isolate DNA from sample material for further analysis. DNA analysis already makes use of high-tech options, but pretreatment of the sample still tends to be time-consuming, manual and, therefore, expensive. The manual aspect causes the same problem for reproducibility. SamPrep offers a fast, inexpensive and reproducible solution.

TNO microbiologists and tool designers have managed to transform the manual process of sample pretreatment into an automated system, one that can be used generically for any kind of analysis that requires pure DNA samples. The samples can be processed within 20 minutes; manual processing of the same task takes up to six hours. TNO has focused initially on detecting *Legionella* to demonstrate how powerful the SamPrep tool is.

The water sample enters the system in a simple miniaturized disposable cassette that TNO has developed itself. The cassette is connected to a number of miniaturized pumps that add various liquids to the sample. Then the cell wall is broken and the DNA that is released is bound, isolated and analysed. Within a couple of hours it is evident whether the water is contaminated with *Legionella*. The system also works for other bacteria, such as hospital and food bacteria. Other applications that will be able to benefit at a later stage are forensic investigations and the detection of anthrax in the air.

The demonstration model that is currently being used reveals the capacity and operation of SamPrep. The main technological development is contained in the disposable cassette that TNO has developed. TNO is now able to offer the concept to companies that may be interested and will continue to focus on the development of new applications.

[Click here for a demo of SamPrep \(wmv format, 5.5 MB, 1 minute 40\).](#)

January 8, 2007

Item 7. Updates on Previously Identified Issues

7.1 Proposal for Recognizing Water as a Basic Human Right

EUROPEAN ECO-FORUM NEWSLETTER

No 16

JANUARY 2007

TOWARDS BELGRADE-2007

1. FIRST MEETING OF THE PARTIES TO THE PROTOCOL ON WATER AND HEALTH

The first Meeting of the Parties to the Protocol on Water and Health to the Convention on the Protection and Use of Transboundary Watercourses and International Lakes was held on 17-19 January 2007 at the Palais des Nations, in Geneva, Switzerland.

The Meeting of the Parties was organized by UNECE and the WHO Regional Office for Europe which are jointly servicing the Protocol. Representatives of 33 states, European Commission, international organizations, EEA, NGOs and others participated in the MOP-1. Anna Tsvetkova (MAMA-86; Coordinator of ECO-Forum's Water Issue Group) and Sergey Vykhryst (representative of ECO-Forum in Legal Board of the Water Convention) represented the European ECO-Forum.

The Protocol entered into force in August 2005 and to date has been ratified by 20 countries. The main aim of the Protocol is to protect human health by better water management, including the protection of water ecosystems, and by preventing, controlling and reducing water-related diseases. It requests Parties to establish targets and target dates to reduce water-related diseases. It includes provisions for international cooperation and international support for national action to support its implementation.

At MOP-1, the European ECO-Forum presented and disseminated among the delegations the NGO Statement. The European ECO-Forum urged the Parties to take urgent measures for establishing monitoring systems of the water related health problems in the rural areas of the countries of

Eastern Europe, Caucasus and Central Asia (EECCA). ECO-Forum called upon the Governments to put the priority on rural water supply and sanitation by development of the adequate legislation, regulations, policies, work plans and associated budget allocations to improve access to safe water and proper sanitation in rural areas of EECCA and Central and Eastern Europe (CEE).

ECO-Forum stressed that the actual implementation and achievement of the Protocol targets happens at local level. Therefore, local authorities should be informed and involved into the Protocol's implementation at early stage.

ECO-Forum requested that Country Reports on water and health and progress achieved on the implementation of the Protocol had to be open and available for the public.

In addition, European ECO-Forum made a proposal for Parties and Signatories to consider development of guidelines for governments (national and local authorities) on public awareness and information. These guidelines would help in implementation of the provisions of Article 9 and Article 10 of the Protocol by reducing practical constraints for citizens wishing to use the Protocol. ECO-Forum urged that the guidelines should be adopted at the Second Meeting of Parties that would be hosted by Romania in 3 years.

At MOP-1, the Parties adopted several decisions:

- The rules of procedure were adopted with the deletion of paragraph 3 of rule 20 due to the pressure of Germany, UK and Switzerland. This paragraph was about NGO participation as observers at Bureau meetings.
- The MOP elected the Bureau. The Bureau has 6 members: Chair from Romania plus representatives of Ukraine, Norway, Finland, Switzerland, and Hungary.
- Compliance procedure under the Protocol on Water and Health was adopted. MOP-1 elected 9 members of the compliance committee nominated by the Parties. Among them there are 3 NGO representatives: Diana Iskrevia-Indigo, NGO "Earth forever", Bulgaria, nominated by Switzerland; Sergey Vykhryst - ECO-Forum expert - nominated by Hungary; and a representative from French NGO nominated by France at the meeting.
- Programme of work for 2007-2009 was developed and adopted. ECO-Forum's proposals on public information and education strengthening are reflected in Programme area 1: Implementation, para 1.4 Public awareness, education, training, research and development and information (lead Party - Romania, has to be confirmed; participating countries - all interested Parties; among the main partners are relevant NGOs).
- The MOP considered and adopted a decision on the designation of focal points for the Protocol and their responsibilities.
- The MOP discussed the opportunity of opening the Protocol to countries outside the UNECE region. Due to the limits of time and the procedure difficulties the amendment was not prepared.

Hungary and Switzerland expressed the readiness to prepare a proposal to amend the Protocol and asked for support of the Joint secretariat.

- The MOP agreed on (a) the preparation of draft guidelines on reporting, for consideration at the MOP-2; and (b) the preparation by end of 2008 of an interim report on water supply and sanitation issues, based on these draft guidelines.

- An Ad Hoc Project Facilitation Mechanism (PFM, initiative of Norway) was adopted to support national action concerning the improved formulation of projects, in order to facilitate access to sources of finance. In the context of this initiative, Finland presented the draft of the first project proposals "Strengthening Water and Health in the EECCA countries", which will be implemented with use of PFM.

- In the context of the item "Financial arrangements", it was decided to establish two trust funds under the Protocol.

- The declaration of the first Meeting of the Parties was adopted. Due to the efforts of ECO-Forum, the paragraph on water as a basic human right was incorporated into the Declaration in context of evaluation of the Round Table "The Human Right to Water and the Protocol on Water and Health: making access to water a reality". The Round Table took place on 18th January in the framework of the MOP-1. Anna Tsvetkova was one of the panelists and made an intervention on the role of NGOs in improving access to safe water in EECCA.

The documents of MOP-1 are available at:

http://www.unece.org/env/water/meetings/documents_MoPPWH.htm

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MAMA-86, Ukraine

Coordinator of Water Issue Group at European ECO-Forum

7.2 Stronger Policies needed Worldwide for Curbing Greenhouse Gas Emissions

Sources: [a more complete list of sources]

Britain Ties Carbon Offsetting to UN Standard

<http://www.planetark.com/dailynewsstory.cfm/newsid/39904/story.htm>

UK to tackle bogus carbon schemes

<http://news.bbc.co.uk/2/low/business/6273061.stm>

UK wants stiff carbon offset standards

<http://www.carbonpositive.net/viewarticle.aspx?articleID=539>

Emissions trading: Commission decides on second set of national allocation plans for the 2008-2012 trading period

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/07/51&format=HTML&aged=0&language=EN&guiLanguage=en>

Commission puts CO2 squeeze on Belgium and Netherlands

http://www.insnet.org/ins_headlines.rxml?id=3946&photo=

Commission proposes an integrated energy and climate change package to cut emissions for the 21st Century

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/07/29&format=HTML&aged=0&language=EN&guiLanguage=en>

EU defends leadership in 'world war' on climate change

<http://www.euractiv.com/en/sustainability/eu-defends-leadership-world-war-climate-change/article-160848>

Climate Change: Why a Global Response needs European Leadership. Stavros Dimas SPEECH/07/8

<http://europa.eu/rapid/pressReleasesAction.do?reference=SPEECH/07/8&format=PDF&aged=0&language=EN&guiLanguage=en>

Tokyo Climate Change Meeting Eyes Post-Kyoto Rules

<http://www.planetark.com/dailynewsstory.cfm/newsid/40011/story.htm>

UN urges developing countries on climate change

http://www.khaleejtimes.com/DisplayArticleNew.asp?xfile=data/theworld/2007/January/theworld_January729.xml§ion=theworld&col=

Climate change cannot be tackled by G8 members alone, says Merkel

<http://business.timesonline.co.uk/article/0,,19149-2564392,00.html>

Cebu Declaration on East Asian Energy Security. Cebu, Philippines, 15 January 2007

<http://www.aseansec.org/19319.htm>

East Asia summit signs energy security accord

<http://www.iht.com/articles/2007/01/15/business/asean.php>

Ten Major Companies Call for Climate Action

<http://www.environmentaldefense.org/article.cfm?ContentID=5828>

A Call to Action report

http://www.environmentaldefense.org/documents/5829_USCAPreport.pdf

US-CAP coalition site <http://www.us-cap.org>

President Delivers "State of the Union"

<http://www.whitehouse.gov/news/releases/2003/01/20030128-19.html>

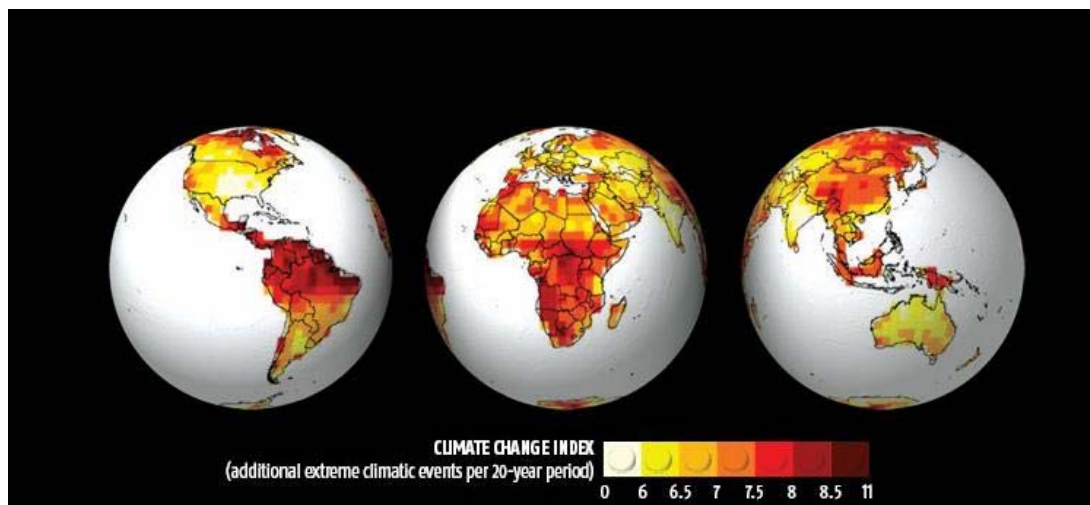
7.4 Climate Change

8.4.2 Mapping Climate Change

Mapping Climate Change

2100: A world of wild weather

NewScientist.com news service, 18 January 2007



Climate change index, with greater changes in darker shades

Source:

2100: A world of wild weather. NewScientist.com news service, 18 January 2007

<http://environment.newscientist.com/article/mg19325874.000?DCMP=NLC-nletter&nsref=mg19325874.000>

7.6 Nanotechnology Safety Assessment

More details on the activities mentioned:

The American Public Health Association has included addressing the potential safety risks of nanotechnology as one of its public health policies. The policy says that more research is needed on the materials' toxicity and on aspects of workers' exposure. It also offers recommendations for actions by federal agencies and others.

Source: Safety Risks of Nanotechnology. American Public Health Association (see [below](#) the text of the announcement)

In January the National Nanotechnology Initiative (NNI) held a Public Meeting on Research Needs related to the Environmental, Health, and Safety Aspects of Engineered Nanoscale Materials at which 15 speakers from all concerned sectors presented their views on research needs and their prioritization, augmented by previously submitted public comments. This material will be used to formulate the government's recommended priorities for safety-related research on nanomaterials, which in turn will guide future funding. These conclusions are of vital concern to all those responsible for nanotech safety planning.

Source: Public Meeting on Research Needs and Priorities Related to the Environmental, Health, and Safety Aspects of Engineered Nanoscale Materials https://nnco.nano.gov/public_ehs/

The International Council on Nanotechnology has held one invitation-only workshop to develop an International Nanomaterial Environmental Health and Safety (NanoEHS) Research Needs Assessment, and plans a second workshop, to be held in Europe in Spring 2007. According to the organizers, the first meeting, held in January 2007, (a) "developed a matrix of classes of

nanomaterials that includes critical physical properties, known bio-interactions, potential applications, volumes, and potential hazards, and (b) proposed a prioritized timeline for when research results are needed for different classes." The second workshop is charged with producing a detailed plan for research needed to establish toxicological principles for the classes of nanomaterials along with potential mechanisms to accelerate progress.

Source: ICON Research Needs Assessment Workshop

http://icon.rice.edu/centersandinst/icon/events.cfm?doc_id=10003

A symposium, "Nanotoxicology: Potential Risks and Safety Assessment", was held at Sweden's Nobel Forum. The meeting, attended by more than 100 experts, presented a wide spectrum of results related to understanding of properties and effects of nano-sized particles that have implications for occupational health. A review based on the symposium will be published early this year in the journal *Nanotoxicology*.

Source: Mini-symposium on Nanotoxicology: Potential Risks and Safety Assessment

http://www.imm.ki.se/sft/pdfLW/SFT,KI,Nanotox_program_final,Nov27,2006.pdf

A team led by Zhao Yu-liang from the Chinese Academy of Science's National Center for Nanoscience and Technology (NCNST) has started research into the bio-safety of artificial nano-materials. The group plans to investigate all major aspects of the characteristics of nanomaterials and the relation between those and their bio-toxicity.

Sources: NCNST: http://www.nanoctr.cn/e_index.jsp

China kicks off study on bio-safety of nanomaterials

<http://www.nanowerk.com/news/newsid=1234.php>

In a recent talk, Andrew Maynard, chief science advisor for the Project on Emerging Nanotechnologies at the Woodrow Wilson International Center, summarized the growing importance of nanotechnology (an estimated 2 million workers by 2015) and warned that safety experts are ill-equipped to handle nanotech in the workplace, partly because of incomplete information. He proposed a middle-of-the-road approach to nanomaterial control, based on an "impact index" derived from the material's physical characteristics, and an "exposure index" related to its quantity and "dustiness". He concluded by laying out recommendations for the further work needed on nanotech risk assessment and control, measures which should be carefully studied by all concerned with nanotech safety.

Sources: Safety experts ill-equipped to handle nanotechnology in workplace

<http://www.physorg.com/news86529890.htm>

Nanotechnology and safety

<http://www.cleanroom-technology.co.uk/story.asp?sectionCode=44&storyCode=44919>

An International Symposium on Nanotechnology in Environmental Protection and Pollution, organized by the Asia Pacific Nanotechnology Forum, is planned to be held in Ft. Lauderdale, Florida, 10-12 December 2007. Conference themes will include nanotechnology in environmental protection; nanotechnology hazards and helpers in applications; and nanotechnology toxicity and environmental pollution.

Source: International Symposium on Nanotechnology in Environmental Protection and Pollution
ISNEPP 2007

<http://www.isnepp.org/ISNEPP07/front1.htm>

Safety Risks of Nanotechnology

Source: American Public Health Association

Author: n/a

[The American Public Health Association \(APHA\)](#) has included addressing the potential environmental and occupational health and safety risks of nanotechnology as one of its recently adopted public health policies. APHA's policy says that more research is needed on nanomaterials' toxicity and methods for measuring, monitoring, and controlling the exposure of workers handling nanomaterials. It also says that funding for researching health and environmental impacts should be kept separate from funding for researching health and environmental applications. The policy offers three recommendations: Congress should increase funding for occupational and environmental health and safety research; manufacturers should adopt voluntary programs to protect against human and environmental exposures; and federal agencies should require the submission of safety data for nanomaterials and provide interim risk management measures. The policy can be viewed online at the link below.

<http://www.apha.org/legislative/policy/policysearch/index.cfm?fuseaction=view&id=1327> (if link not working, alternate source: American Public Health Association adopts policy on nanotechnology <http://www.nanowerk.com/news/newsid=1177.php>)